Remarks

The above change is being made in order to make the current attorney docket of record.

In the office action of June 4, 2003, the examiner has first withdrawn the indicated allowability of claims 1 through 5, and then has rejected claims 1 through 5 under 35 U.S.C. §102 as being anticipated by Bryan U.S. Patent Number 5,561,468. Also, the examiner has rejected claim 9 under 35 U.S.C. §103 as being obvious over Bryan in view of newly-cited Narashima which the applicant understands to be U.S. Patent Number 6,125,125. That identification is not set forth in the office action. Reconsideration of the rejections is requested.

U.S. Patent No. 5,561,468 (Bryan et al.) describes a method and apparatus for transmitting a digital television signal which provides for time multiplexing of audio and video data using corresponding levels of a single QAM modulation constellation. The stream of symbols comprising the transmitted data is structured according to a repeated motif called "inter-alternation interval" (See Col. 4, l. 3-15 and Fig. 1). Each inter-alternation interval comprises a "main header" which includes a so-called "long" training sequence. Such training sequence consists for instance of an integer number (K) of periods of a (single) CAZAC sequence of length N (Col. 5, l. 19-33).

In one embodiment, only such a long training sequence is inserted in each inter-alternation interval (Col. 5, l. 45-47).

In the preferred embodiment of the invention, the data stream in an inter-alternation interval also comprises additional headers each comprising "short" training sequences. The "short" training sequences consist of half the number K (chosen for the "long" training sequence) of periods of CAZAC sequences each with a length N.

This clearly provides for building "short" training sequences with K/2 CAZAC sequences, each being different from the others – or at least one being at least different from the others – in order to obtain a training sequence of length K/2*N symbols.

Therefore, the applicant respectfully submits that Bryan only teaches formatting two types of training sequences, both using CAZAC sequences, and one being half the length of the other. Bryan fails to explicitly teach that one type of training sequence is a subsequence of the other type.

The applicant respectfully points out that on col. 3, l. 20-42, a "data packet" is defined as comprising a "header" or a "rate sequence" preceding a data portion.

The examiner appears to have built a correspondence, on the one hand, between a "first type of packet" formatted "on the basis of a first training sequence and of a first information sequence" as recited in claim 1 of the present application and a "data packet" comprising a "main header" (fig. 1, box 2) preceding a "data portion" of Bryan, and on the other hand, between a "second type of packet" formatted "on the basis of a second training sequence and of a second information sequence" as recited in claim 1 and a "data packet" comprising an "additional header" (fig. 1, box 10) preceding a "data portion" attached to it.

In this correspondence, the "first information sequence" would be the data portion attached to the "main header", and the "second information sequence" would be the data portion attached to the "additional header".

Bryan then fails to teach formatting a second type of packet in order to send a second information sequence longer than the first information sequence, as comparing the respective length of data portion attached to the "main header" and data portion attached to the "additional header" is never considered.

More importantly, Bryan teaches that the use of a "short" training sequence instead of the "long" one in additional headers can simply be justified by the fact that "it is not necessary to use the "long" training sequence 11 normally used ..." (see col. 6, l. 4-10). The use of an additional training sequence is rendered necessary in order to cope with disturbances by other devices attached through splitters to the same cable, and certainly not "in order to send a second information sequence longer than the first information sequence". Consequently, the apparatus according to the applicant's invention will format packets of the second type when it is necessary to send a second information sequence longer than the first information sequence.

On the contrary, the addition of a "short" training sequence, according to Bryan's teaching, is directed to certain specific setup of the described digital television system.

Exploiting further the correspondence the examiner considers in his arguments, the "first training sequence" as recited in claim 1 would be the "long" training sequence (fig.1, box 11) incorporated in the "main header" (fig. 1, box 2), and the "second training sequence" as recited in claim 1 would be the "short" training sequence (fig.1, box 12) incorporated in the "additional header" (fig. 1, box 10).

Applicant's claim 1 further recites that the "second training sequence" "corresponds to a subsequence of said first training sequence". As explained above, Bryan does not explicitly teach using a second training sequence that corresponds to a subsequence of a first training sequence. Indeed, Bryan does not explicitly teach that the "short" training sequence corresponds to a subsequence of the "long" training sequence. Instead, Bryan merely teaches composing a first training sequence with K times the same CAZAC sequence of length N, and a second training sequence, twice as short as the first one, with K/2 CAZAC sequences, each with a length N.

It is therefore respectfully submitted that the examiner misinterpreted the teaching of Bryan in this regard.

As such, the expression "data packet" in this context cannot correspond to the "transmitted packets" of predetermined length, a first type of packet being based on a first training sequence and on a first information sequence, a second type of packet being based on a second training sequence, formatted in order to send a second information sequence longer than the first information sequence, and on a second information sequence, the second training sequence corresponding to a subsequence of the first training sequence, as recited by claim 1.

In view of the above, it is submitted that claim 1 is neither anticipated by, nor rendered obvious by, Bryan, and is allowable thereover. As claim 2 depends from claim 1, claim 2 is submitted to be allowable, as well.

**

With regard to claims 3 to 5, the applicant asserts, in view of the above, that Bryan does not teach handling "packets being either of a first type or of a second type and comprising a respective first or second training sequence together with a respective first or second information sequence, the second information sequence being longer than the first information sequence", in which "said second training sequence corresponding to a subsequence of said first training sequence". Bryan describes a receiver (Fig. 5), but fails to teach the use of single demodulators means for demodulating packets of both types, which is a significant advantage of applicant's invention (adding the second type of packets as defined in the invention clearly minimizes the modifications made to a receiver compatible with the first type of packets without significantly degrading its performances – see p. 4, l. 25 to p. 5, l. 6 of the specification).

In view of the above, it is submitted that claim 3 is neither anticipated by, nor rendered obvious by, Bryan, and is allowable there over. As claims 4 and 5 depend from claim 3, claim 2 is submitted to be allowable, as well.

**

With regard to claim 9, Narashima teaches the use of orthogonal training sequences that will not interfere with each other if received simultaneously (col. 3, l. 9-14). However, the situation of training sequences interfering with each other when received simultaneously is inconsistent with Bryan's teaching. Indeed, as mentioned above, Bryan teaches using two types of training sequence, one being shorter than the other and being used in addition to the other, in a data packet time multiplexing structure (see Fig. 1). The use of an additional "short" training sequence is made necessary for some digital television system configurations, that is such a "second training sequence" is used as a supplement to the performances of the "first training sequence". Experimenting interferences between those "first" and "second" training sequences would be inconsistent with the fact that one complements the other, and would not be used or received simultaneously with the other. In fact, interference between two training sequences occurs when for instance a mobile unit simultaneously receives training sequences which are part of signals respectively transmitted by several base stations. It is clear from Fig. 1, the envisioned time multiplex structure and the envisioned applications in Bryan's teaching (television signals broadcasting) that such potential interference is not considered between said "short" and "long" training sequences. Therefore, it is respectfully submitted that the one skilled in the art would not consider combining the teachings of Bryan and Narashima.

Furthermore, the applicant's invention provides for the use of first and second training sequences which are not merely orthogonal to each other, as taught by Narashima. Narashima's teaching relates to training sequences used in a cellular TDMA network. The training sequence transmitted by the BTSs are orthogonal to each other (col. 3, l. 5-17), and

most likely of the same length. Narashima does not teach how to obtain the orthogonality between two training sequences of different sizes. In this regard, applicant points out that claim 9 recites a "second training sequence being orthogonal to subsequences of the same length of said first training sequence". Accordingly, the second training sequence (of length l) is shorter than the first one (of length L) - the second training sequence has the same length as a subsequence of said first training sequence-, and orthogonal to all subsequences of length l of the first training sequence. This provides, in addition to the invention's advantages as mentioned in the specification on page 3, final paragraph – "to provide a packet of a second type which is compatible at transmission level with a packet of a first type ... presenting greater capacity than the first, and being designed to minimize the modifications made to the various pieces of equipment and to degrade reception performance as little as possible" – a significant reduction of the risk of interference between two packets of different types.

For this reason, it is submitted that, even though Narashima may teach orthogonal training sequences, combining the teachings of Bryan and Narashima would not lead one of ordinary skill in the art to the invention as claimed in claim 9.

In view of the above, it is submitted that claim 9 is not rendered obvious by Bryan, in view of Narashima, and is allowable thereover.

Given the above, it is submitted that this application is fully in condition for allowance, and the examiner's further and favorable reconsideration in that regard is urged.

September 4, 2004

Respectfully submitted,

William M. Lee, Jr.
Registration No. 26,935
Barnes & Thornburg
P.O. Box 2786
Chicago, Illinois 60690-2786
(312) 214-4800